

## **REMARKS**

### **Status of the Claims**

Claims 1-6, 9-13, 20 and 23-28 are being examined in the present application, with claims 1 and 20 being independent claims. Claims 1, 20 and 28 have been amended. Reconsideration of the pending claims is respectfully requested.

### **Amendments to the Claims**

Claim 1 is amended to recite an *isolated* biological tissue slice *harvested from healthy tissue* and having a geometry suitable for implantation at the repair site. The claim is further amended to recite that viable cells can “migrate out of the tissue slice” and can “proliferate and integrate with tissue at the site of tissue injury or defect.” The amended claim 1 deletes the recitation to the “effective amount of viable cells that naturally occur within the tissue slice.” Support for the amendments of claim 1 are found throughout the specification of the published application, and particularly in paragraphs 9, 30, 37, 38 as well as in Figure 1 of U.S. Patent Publication No.: US2005/0125077.

Claim 20 is amended to recites the step of “providing a biological tissue implant comprising an *isolated biological tissue slice harvested from healthy tissue*.” The amended claim deletes the recitation to “the tissue slice including an effective amount of viable cells that naturally occur within the tissue slice.” Furthermore, the claim now recites “allowing viable cells to migrate out of the tissue slice.” Support for the amendments of claim 20 are found in the specification of the published application, and particularly in paragraphs 106 and 107 of U.S. Patent Publication No.: US2005/0125077.

Claim 28 has been amended to recite that the slice is configured as a strip.

No new subject matter has been added by these amendments.

Applicants present the following amendments and cancellations for the sole purpose of expediting prosecution of the pending claims. It is understood that such amendments and cancellations are made without prejudice, and do not amount to Applicants acceptance of the

Office Action's rejections. Applicants reserve the right to prosecute any of the former forms of the claims in a continuing application.

**Patentable Subject Matter Under 35 U.S.C. §101**

Claims 1-6, 9-13, 20 and 23-28 currently stand rejected under 35 U.S.C. §101 as being related to non-statutory subject matter. Amended claim 1 recites a tissue implant comprising an *isolated biological tissue slice* harvested from healthy tissue that has a geometry suitable for implantation at a tissue site. Furthermore, amended claim 1 recites a retaining element for securing the isolated tissue slice to the tissue site. Thus, the amended claim does not recite a right in a human being, and constitutes patentable subject matter. Claims 2-6, 9-13, and 28 depend ultimately from amended claim 1, and are also directed to patentable subject matter for at least the same reasons.

Additionally, amended claim 20 recites a method for repairing tissue injury or defect that includes providing a biocompatible tissue implant comprising an isolated biological tissue slice harvested from healthy tissue, having a geometry suitable for implantation at an injury or defect site. Accordingly, the claim is also directed to patentable subject matter for at least the same reasons as for amended claim 1. Since claims 23-27 depend from amended claim 20, these claims also contain patentable subject matter for at least the same reasons previously stated.

**Definiteness Under 35 U.S.C. §112**

Claims 1-6, 9-13, 20 and 23-28 currently stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the inventions. Specifically, the Examiner states that independent claims 1 and 20 are indefinite because they use the phrase "effective amount". Amended claims 1, and 20 no longer recite the phrase "effective amount". Accordingly, their respective indefiniteness rejections are rendered moot. The dependent claims incorporate the recitation of their respective base claims. In view of these amendments, claims 1-6, 9-13, 20 and 23-28 abide by the requirements of 35 U.S.C. §112, second paragraph.

**Novelty Under 35 U.S.C. §102***Novelty of Independent Claim 1*

Claims 1-3, 9, 10, 20 and 23-25 currently stand rejected under 35 U.S.C. §102(b) as being anticipated by Kandel et al. (US Patent No. 6,077,989). The claims, however, are novel because Kandel does not disclose a biocompatible tissue implant comprising an isolated biological tissue slice that is harvested from a healthy tissue.

Amended claim 1, recites a biocompatible tissue implant for repairing a tissue injury or defect. The claimed implant comprises an *isolated biological tissue slice harvested from healthy tissue* and having a geometry suitable for implantation at the repair site. The tissue slice has an effective amount of viable cells and serves as a cell source. Cells can migrate out of the tissue slice and can proliferate and integrate with tissue at the site of tissue injury or defect. Amended claim 1 further recites a retaining element for securing the tissue slice at the site of injury or defect.

In contrast, Kandel discloses a bioresorbable implant made of *calcium phosphate or calcium polyphosphate*. The implant has a surface (figure 1, 18), that serves as a support or an attachment surface on which cells are placed for growth of new tissue (see Kandel, col 3, lines 38-43). In fact, Kandel specifically discloses using the implant as a support surface for allowing soft connective tissue cells to form soft connective tissue in-vitro (i.d., col. 10, lines 44-47, and Figure 2, 28). According to Kandel, (i.d., col. 10, lines 50-55), cells may be *seeded* onto the surface prior to implantation and cultured in-vitro to form *reconstituted tissue* which attaches to the implant.

Kandel's teachings, thus pertain only to *implants made of inorganic polymers* and the *seeding of such implants with cells*. In fact, Kandel provides absolutely no hint or suggestion about the use of an isolated biological tissue slice harvested from a healthy tissue as recited by amended claim 1. The sections of the Kandel reference alluded to in the instant office action (i.d., col. 3, lines 55-62; col. 11, lines 63-67; col. 12, lines 1-6; and Figure 2) pertain to a method for isolating cells from soft connective tissue and the use of the isolated cells for seeding the implant ex-vivo, and do not disclose or suggest an implant comprising an isolated biological tissue slice harvested from healthy tissue. The recitations of amended claim 1 are not anticipated

by Kandel. Amended claim 1, therefore, clearly distinguishes over the Kandel reference and contains allowable subject matter.

Claims 2-3, 9, and 10 depend on amended claim 1. These dependent claims incorporate the recitations of the respective base claim. Thus, the dependent claims are patentable for at least all the reasons mentioned above for amended claim 1.

Additionally, some of the dependent claims are patentable over Kandel for other independent reasons. For example, claim 9 recites the implant of claim 1, wherein the retaining element is selected from the group consisting of fasteners, staples, tissue tacks, sutures, adhesives, and combinations of these. The Office Action states that Figure 2 of the Kandel reference discloses a “tapered shape” interpreted as a tissue tack. Applicants respectfully disagree.

Figure 2 of the Kandel reference shows a schematic of an anchor device implanted within a cavity created in the bone. The implant has an overall frustoconical shape which allows it to be press fitted into a similar shaped cavity in the bone (col. 6, lines 63-67; and col. 12, lines 6-10). It is clear from the specification of Kandel that the implant is anchored at the site of repair by inserting the bone engaging portion into a preformed cavity. *No additional retaining element(s)* such as those disclosed in claim 9 of the current application are used to secure Kandel’s device at the repair site. In contrast, claim 9 requires the tissue slice to be secured at the site of repair using retaining elements. Kandel, therefore does not anticipate claim 9.

*Novelty of Independent Claim 20:*

Amended claim 20 recites a method for repairing tissue injury or defect. The claimed method comprises using an isolated biological tissue slice harvested from healthy tissue, and of suitable geometry as a biocompatible implant for tissue repair. The implant is delivered to a tissue site in need of repair and secured at the site of repair. Upon implantation, viable cells from the tissue slice can migrate out of the tissue slice so as to proliferate and integrate with the tissue at the repair site.

As mentioned above for overcoming the rejection of amended claim 1, Kandel does not disclose using an isolated biological tissue slice harvested from healthy tissue as an implant, nor

does he disclose or suggest a method for tissue repair using an isolated biological tissue slice. Kandel fails to teach cells from a tissue slice migrating out to populate and integrate with the surrounding tissue at the site of repair. Kandel discloses seeding the implant with cells prior to use or alternatively, allowing the tissue to grow on the implant surface ex-vivo prior to use (i.d., col. 10, lines 50-55 and 59-60). Furthermore, the examples in the Kandel reference all pertain to the use of cells to seed the implant (id., Example 2, Trial Example 2).

Amended claim 20 is therefore not anticipated by Kandel, since Kandel does not teach or suggest the claimed method. Furthermore claims 23-25 depend on amended claim 20. These dependent claims incorporate the recitation of amended claim 20. Thus, the dependent claims are patentable for at least all the reasons mentioned above for amended claim 20.

#### *Non-obviousness*

##### *Non-obviousness of Claims 4-6 over Kandel in view of Lafrance*

Claims 4-6 currently stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kandel et al. (US Pat. No. 6,077,989) in view of Lafrance et al. (US Publication No. 2003/0027332). Applicants respectfully disagree with the Examiner, and state that the combination of Lafrance and Kandel together fail to disclose a tissue repair implant comprising an isolated biological tissue slice having a particular thickness and harvested from a healthy tissue.

The Lafrance reference pertains to methods for manufacturing tissue engineered heart valves. In particular, Lafrance discloses using self-supporting *human engineered* tissues for making the valves. Lafrance discloses making the *human engineered* tissues by taking advantage of the abundant synthesis of extracellular matrix by mesenchymal cells cultured in medium containing ascorbic acid.

Lafrance, therefore, relies on *cell culture and tissue engineering* techniques. Nowhere does Lafrance disclose or even suggest using an *isolated slice of biological tissue*, nor does the reference disclose harvesting such a slice from healthy tissue as recited by amended claim 1. Furthermore, Lafrance does not remedy the deficiencies of the Kandel reference. The combination of Lafrance and Kandel, thus fails to teach or render obvious the claimed implant.

Furthermore, to establish a case of *prima facie* obviousness of a claimed invention, the claim limitations must be taught or suggested by the prior art references (see MPEP §2143.03 citing *In re Royka*, 490 F.2d 981 (CCPA 1974)). As mentioned above, the claimed implant is not disclosed by Kandel, and merely combining the teachings of Lafrance with those of Kandel does not result in the claimed device.

Furthermore, claims 4-6 depend on amended claim 1. Since, the dependent claims incorporate the recitation of the patentable base claim, these claims are also patentable over the combination of the cited references. Applicants therefore respectfully request the Examiner to reconsider and withdraw the rejection to claims 4-6.

*Non-obviousness of Claims 4-6 over Kandel in view of Brauker*

Claims 11-13 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kandel et al US Patent 6,077,989 in view of Brauker et al US Patent 6,773,458 B1. Claims 11-13 and 28 depend on amended claim 1, while claims 26 and 27 depend from amended claim 20. The combination of the cited references do not teach or render obvious claims 11-13 and 26-28 because the references do not teach the recitations of the respective base claims.

As mentioned above with respect to amended claims 1 and 20, Kandel does not disclose the claimed tissue implant. Brauker also fails to teach the base claims' implant and method because the reference does not teach or suggest an implant that includes an isolated biological tissue slice having a geometry suitable for implantation at a tissue site, and a retaining element for securing the slice. Brauker teaches a method for making and using an implant assembly that forms loose cells or other materials encapsulated in test membranes. Accordingly, its teachings are nothing like the recitations of claims 1 and 20. Accordingly, the combination of Brauker and Kandel cannot teach the independent claims, and thus dependent claims 11-13 and 26-28 are patentable.

**Supplementary Information Disclosure Statement**

Applicants also file with this response an information disclosure statement. Applicants respectfully request consideration of the references revealed in the statement with respect to the current claims.

**CONCLUSION**

In view of the remarks above, Applicants submit that claims 1-6, 9-13, 20 and 23-28 are in condition for allowance, and allowance thereof is respectfully requested. Applicants encourage the Examiner to telephone the undersigned in the event that such communication might expedite prosecution of this matter.


In the event that a petition for an extension of time is required to be submitted at this time, Applicant hereby petitions under 37 CFR 1.136(a) for an extension of time for as many months as are required to ensure that the above-identified application does not become abandoned.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 141449, under Order No. 22956-235.

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Respectfully submitted,

By:

  
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